



Southern California Edison Risk Assessment and Mitigation Phase Proceeding I.18-11-006 Safety and Enforcement Division Briefing



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Dave Ashuckian, PE
Martin Kurtovich PE
Wendy Al-Mukdad, PE**

**May 29, 2019
Los Angeles, California**





Workshop Agenda

8:30 – 8:45 am Introduction and Background,
Dan Bout, Program Manager, Cyber Security Branch

8:45 – 10:00 am California's Utility Safety Framework
Dave Ashuckian PE, Manager, Utility Risk Assessment
Martin Kurtovich PE, Senior Utilities Engineer

10:00 – 10:15 am BREAK

10:15 am – 10: 45 am Assessment of SCE RAMP Report and Addendum
Martin Kurtovich PE

11:00 – 11:45 am Analysis of SCE Risk Modeling for Wildfire Safety and Contact
with Energized Equipment
Wendy Al-Mukdad PE, Senior Utilities Engineer

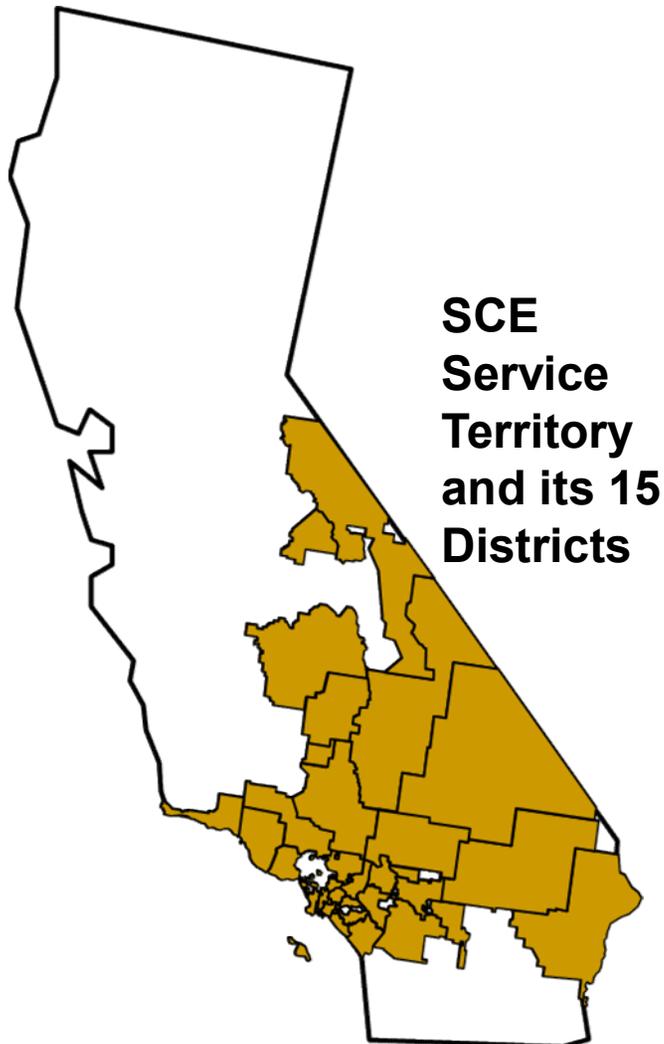
11:45 am – 12:30 pm Public Comments





Risk Management 101

Part II: Risk Management in Southern California



SCE Stats

- 50,000 square miles
- 4.9 million customers
- 76 billion kWh/year of electric service
- Over 400 cities & communities with a collective population of over 13 million (larger in population than 45 states)
- 1,440,000 wood poles
- 50,000 cond-miles of UG primary conductor
- 106,000 cond-miles of OH primary conductor
- 4600 distribution circuits
- 715,000 distribution transformers





A Short History of California Utility Safety

- **2014 – 2019**

- Adoption of CPUC Safety Policy
- Development of New Risk Evaluation Framework
 - Development of Safety Assessment Modeling Protocols (SMAP)
 - Initiation of Risk Assessment and Mitigation Phase (RAMP) Process

Utility Risk Assessment and Mitigation Phase Report –

utility should show how it will use expertise and budget to improve its public safety record

- **2019 forward**

- SB 901 Utility Safety Framework
- Governor's Executive Order on Wildfire Policy
- CPUC Climate Adaptation Proceeding





A Short History of California Utility Safety

Safety Mandates

2014-2018 CPUC Safety Policy

CPUC Safety Guiding Principles include:

 California Public Utilities Commission

Safety Policy Statement of the California Public Utilities Commission

Purpose of this Policy
This is the Safety Policy adopted by the Commissioners of the California Public Utilities Commission (CPUC). It defines the role of the Commissioners, binds together the agency in constantly strengthening our safety efforts, and provides a unifying vision and guidance for the organization's multiple and disparate functions.

As described below, as a first step in applying this policy, we also will direct our staff to provide to the CPUC a more detailed Safety Plan within 180 days, laying out specific elements and staff actions on how the entire organization - including the five Commissioners and their staff, our legal and judicial staff, our policy and program staff, as well as our administrative staff - will respond to this policy in all their work.

CPUC Overarching Safety Mission
The safety mission and goal of the CPUC is to assure to the State of California that all of us will work every day to assure that the regulated utilities we depend on for critical services are as safe and resilient as they can possibly be.¹ The CPUC not only will assure compliance with safety laws and regulations, but also challenge itself and the utilities to excellence.

Ultimately we are striving to achieve a goal of zero accidents and injuries across all the utilities and businesses we regulate, and within our own workplace.²

We have a broad obligation in this mission, and we must assure that safety will always be an important component in all that we do and everywhere we have authority and responsibility. Our efforts must improve protection for the public, for utility workers and CPUC employees in their work, for the environment, and for utility infrastructure and systems.

To realize this Vision, the CPUC commits to these guiding principles:

- Continually assess and reduce the safety risk posed by the companies we regulate
- Hold companies (and their extended contractors) accountable for safety of their facilities and practices
- Be accountable for the oversight of safety in the industries we regulate
- Provide clear guidance on expectations for safety management and outcomes
- Provide transparent and effective procedures for enforcement of those expectations
- Promote reliable access to utility services that support health and safety
- Promote a culture of safety vigilance by CPUC staff, and in the industries we regulate
- Learn from experience and continuously improve safety oversight and outcomes

¹ The CPUC's overall mission is to protect consumers and ensure the provision of safe, reliable utility service and infrastructure at reasonable rates, with a commitment to environmental enhancement and a healthy economy.
² The concept of zero accidents and injuries is based on the Vision Zero Initiative established in Sweden in the 1990s. It began as an approach to roadway safety, and can be summarized as a single sentence: "No loss of life is acceptable." Since 1997, England and the Netherlands have adopted this policy goal, and in 2014, the cities of New York, Boston, and San Francisco also adopted it as their road safety policy expectation. Similarly, the USDOT Pipeline and Hazardous Material Safety Administration states, "our vision is that no harm results from hazardous materials transportation."
1

July 10, 2014



1. The CPUC is accountable for safety
2. The CPUC must continually assess and reduce the safety risk
1. The CPUC must hold utilities accountable on safety
2. Set Safety Expectations for Utilities
3. Oversee and Ensure Expectations are Met
4. Promote Safety Culture
5. Continuous Improvement Process





2019

SB 901 Utility Risk Framework

Establishes a Management Framework with –

Specific Objectives:

- **Minimize risk**
- **Highest level of safety, reliability, and resiliency**

Specific Requirements:

- **Safety Performance Metrics**
- **Risk Assessments**
- **Safety Mitigation Strategies and Programs**
- **Restoration and Recovery Plans**
- **Independent Evaluations**
- 6 **Community Outreach and Partnering**

SB 901 Utility Safety Framework

Objective: Each electrical corporation shall construct, maintain and operate its electrical lines and equipment in a manner that will **minimize the risk of catastrophic wildfire** posed by those electrical lines and equipment. **with the highest level of safety, reliability and resiliency** (Note does not distinguish between distribution and transmission, addresses all lines)

Components:

- Identification of **roles and responsibilities**
- **Program objectives**, short and long-term
- **Safety Performance Metrics**
- **Identify, describes and prioritizes all risks** and associated drivers for all equipment and facilities, particular risks and drives associated with topographic and climatological risk factors.
- **Methodology for identifying enterprise wide safety risk** and wildfire-related risk
- **Reassessment of high fire threat areas**, Identification of any geographic area in utility's service territory than is currently identified in fire threat map, where Commission should expand the high fire threat district
- **Description of safety mitigation strategies and programs**, should include dynamic climate change risks
- De-energization protocols
- Veg Management Plans
- Inspection Plans
- Includes disaster and emergency preparedness plans
- **Restoration and Recovery Plans**
- **Community outreach and public awareness** program
- Plan for how utility will **monitor and audit** implementation, inspections and identify plan deficiencies
- **Penalties for failure to implement**
- **Independent evaluation** of safety culture every five years
- **Independent evaluation** of implementation of mitigations and inspections

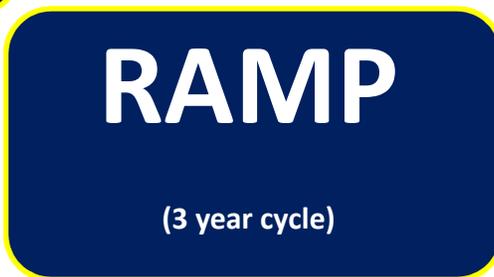




Building A New Risk Evaluation Paradigm



Safety Model Assessment Proceeding
Development of utility risk-based decision making model (A.15-05-002 et al) then ongoing reporting, verification, and evaluation



IOUs use approved risk analytics including adopted modeling protocols to –

- 1) Identify and determine prioritize risks,
- 2) estimate risk impacts
- 3) propose mitigation programs, plans and budgets



Each S-MAP, RAMP, and GRC proceeding generally have different assigned judges. There is no Decision made in the RAMP proceeding. Any staff recommendations are informally rolled into the GRC proceeding.

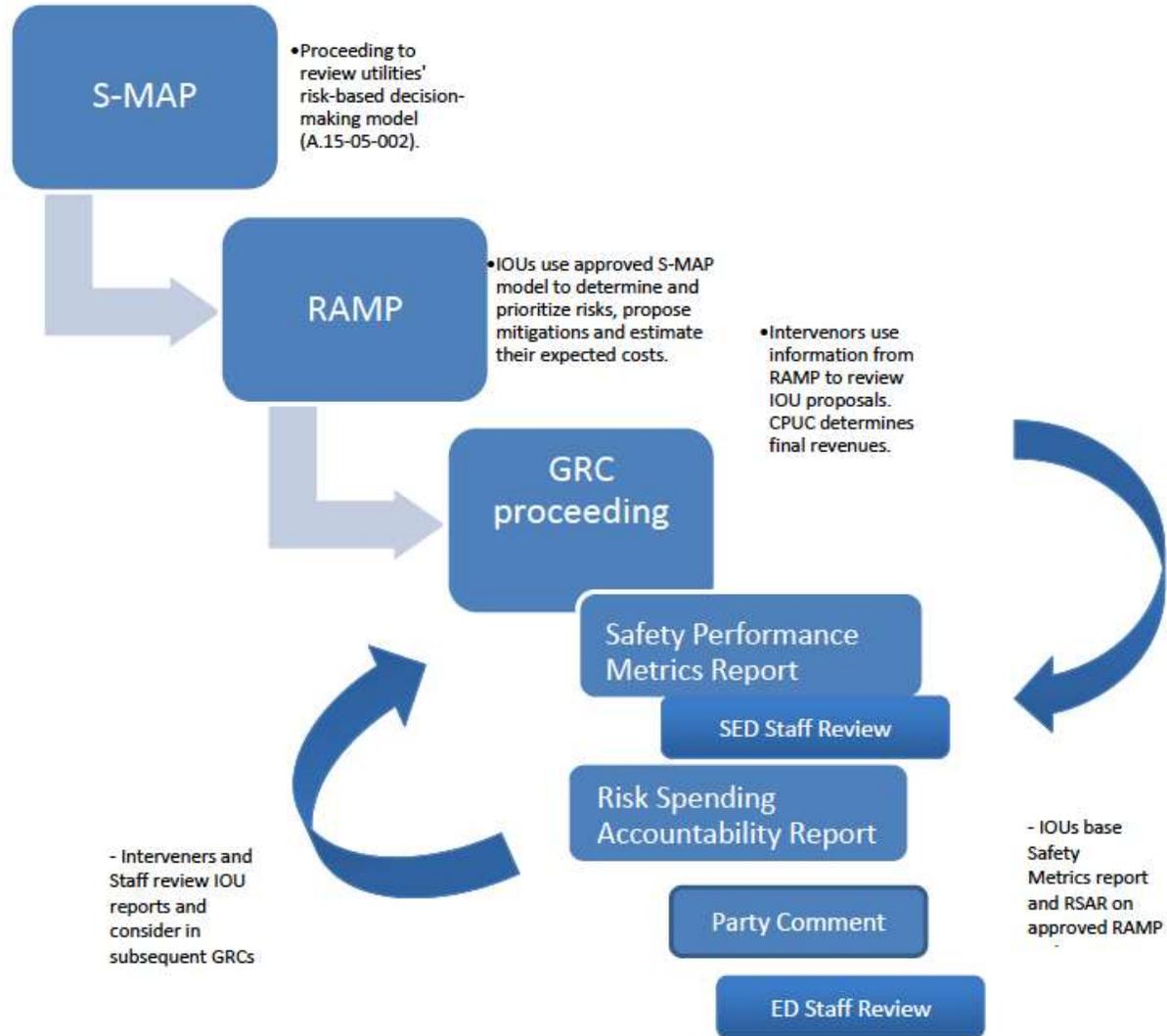
IOUs seek funding. Intervenor use information from RAMP to review IOU proposals. CPUC determines final revenues.





Building A New Risk Evaluation Paradigm

Figure 1: S-MAP - RAMP - RSAR - Safety Performance Metrics Cycle





S-MAP Settlement Agreement (SA) Established Risk Modeling and Assessment Protocols for California

- Establishes uniform risk modeling requirements across utilities
- Requires mathematically correct and logically sound methodologies
- Requires transparency and sufficient data for third parties to assess utility judgments
- SCE incorporated many features of this Agreement as drafted in May. Includes Multi Attribute Risk Score (MARS) risk modeling.





Required Protocol for RAMP First 10 Steps

The utility should show how it will use its expertise and budget to improve its safety record. To do so, each utility should:

1. Identify its top risks
2. Describe the controls or mitigations currently in place
3. Present its plan for improving the mitigation of each risk
4. Present two alternative mitigation plans that it considered
5. Present an early stage “risk mitigated to cost ratio” or related optimization
6. Identify lessons learned in the current round to apply in future rounds
7. Move toward probabilistic calculations to the maximum extent possible
8. For those business areas with less data, improve the collection of data and provide a timeframe for improvement
9. Describe the company’s safety culture, executive engagement, and compensation policies
10. Respond to immediate or short-term crises outside of the RAMP and GRC process





“A New Risk Evaluation Paradigm”

GRC Proceedings

CPUC Safety Policy implementation

Post Settlement Agreement

Safety Model Assessment Proceeding (S-MAP)

Risk Assessment Mitigation Phase (RAMP)

Climate Adaptation Proceeding

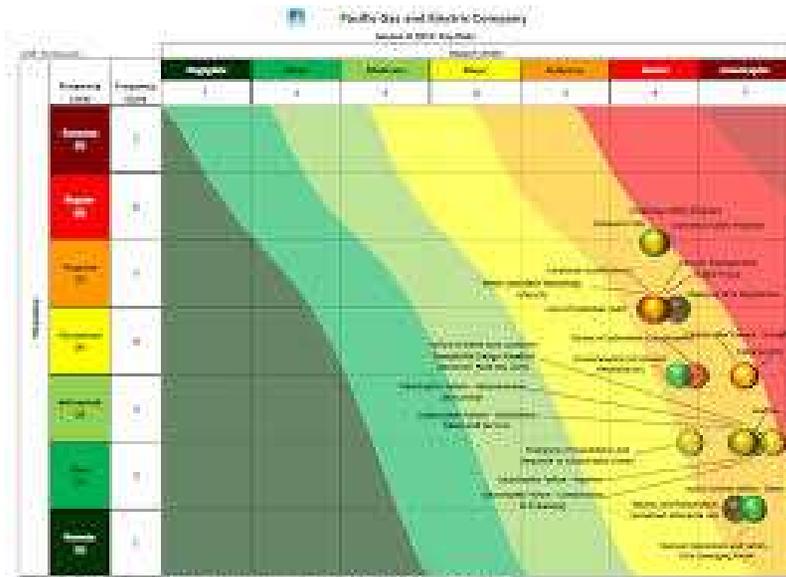
SB 901/EO N-05-019 implementation

SCE RAMP & CPUC Review

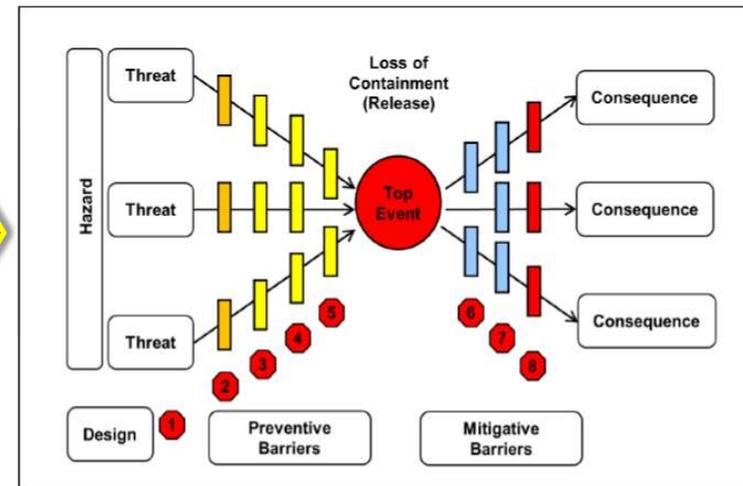




Bowtie Risk Model, Risk Matrix, Risk Modeling



CPS Center for Process Safety
 Process Safety Metrics: Guide for Selecting Leading and Lagging Metrics

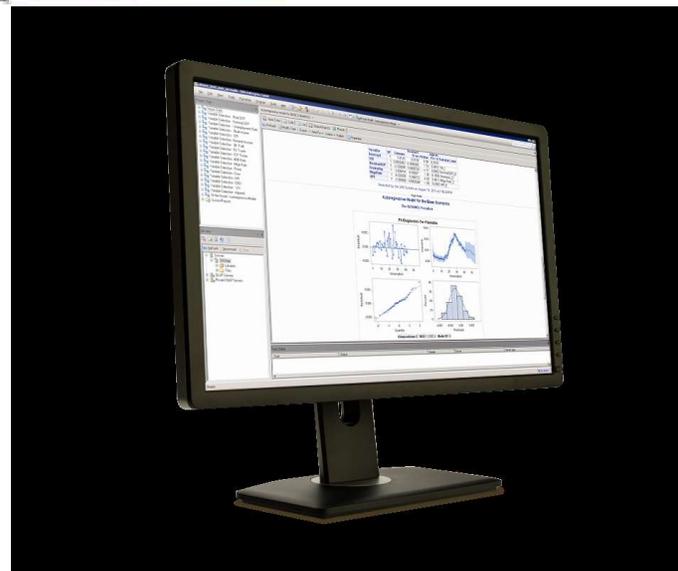


Risk Matrix

Risk Modeling

Monte Carlo
 Probabilistic
 Estimates of
 Consequences

12



Bowtie Analysis

- Parsing of Risk
- Drivers/Threats
- Event
- Consequence/Impact
 1. Injuries
 2. Fatalities
 3. Utility Damages
 4. Reliability





Identification of Risks to Utility Assets and Operations

SCE's Top Safety Risk



Building Safety

Failure of structural or non-structural building components that potentially causes harm to occupants

?



Contact with Energized Equipment

Contact with energized equipment which potentially causes electric shock



Cyber Attack

Compromise of SCE system controls which potentially leads to data exfiltration, loss of control, and/or adversary control of grid control systems



Employee, Contractor and Public Safety

Act performed which potentially exposes workers or public to hazards

?



Hydro Asset Safety

Uncontrolled rapid release of water that potentially inundates populated or unpopulated areas

FERC/DWR



Physical Security

Compromise of SCE physical security which potentially leads to workplace violence, property theft, asset/equipment damage, or loss of control of asset



Wildfire

Ignition associated with SCE which potentially causes a wildfire



Under-ground Equipment Failure

Asset failure which potentially causes substantial and uncontrolled release of energy from a vault or manhole



Climate Change

Failure of SCE to prepare for climate change which potentially causes loss of control or destruction of assets

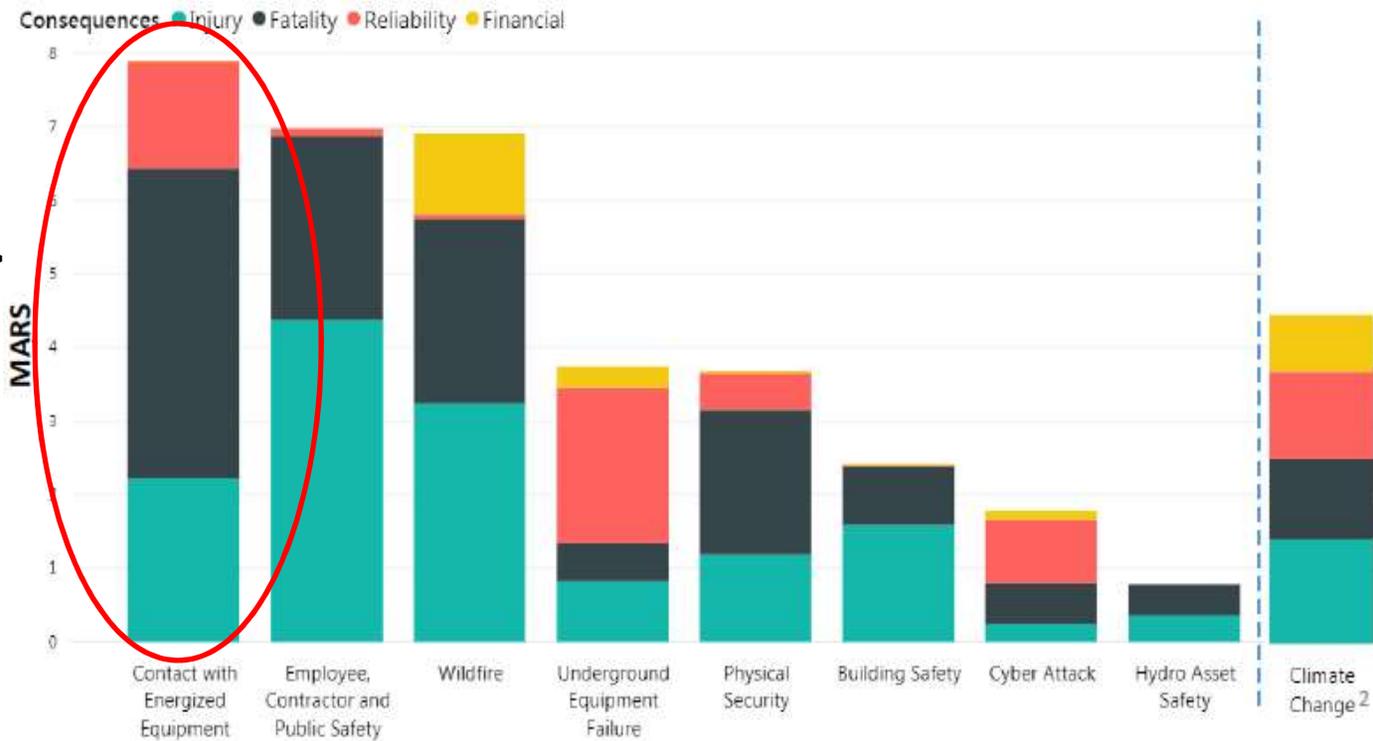




Identification of Risks to Utility Assets and Operations - SCE's Top Safety Risks and Associated Multi Attribute Risk Score (MARS)

Results: Baseline MARS for the 9 Risks (Mean)¹

of fatalities > # of injuries



[1] Modelled results reflect the annual average mean results over the 2018-2023 time period

[2] Note: Climate Change data inputs modelled for 99th percentile events, and as such, the results are not directly comparable

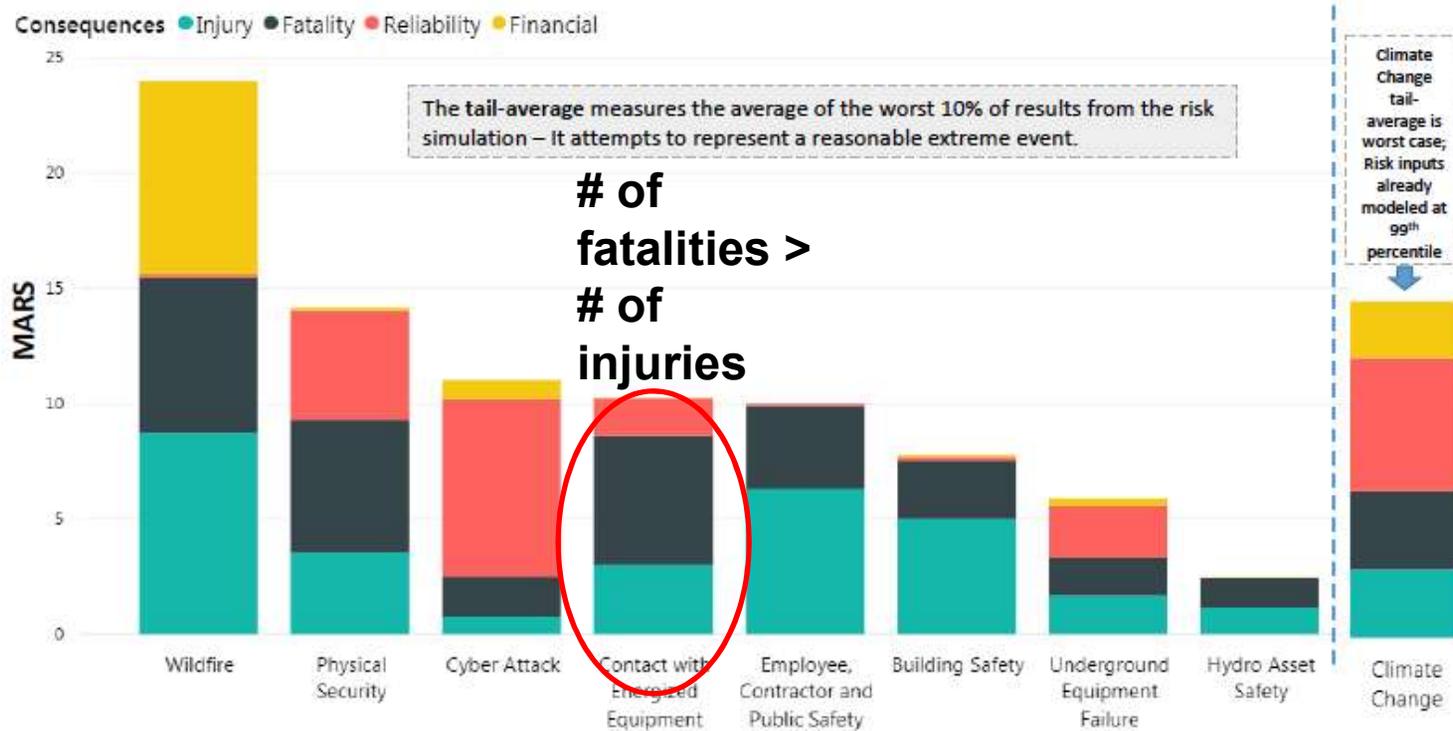




Identification of Risks to Utility Assets and Operations

SCE's Top Safety Risk

Results: Baseline MARS for the 9 Risks (Tail-Average)¹



[1] Modelled results reflect the annual average tail-average results over the 2018-2023 time period

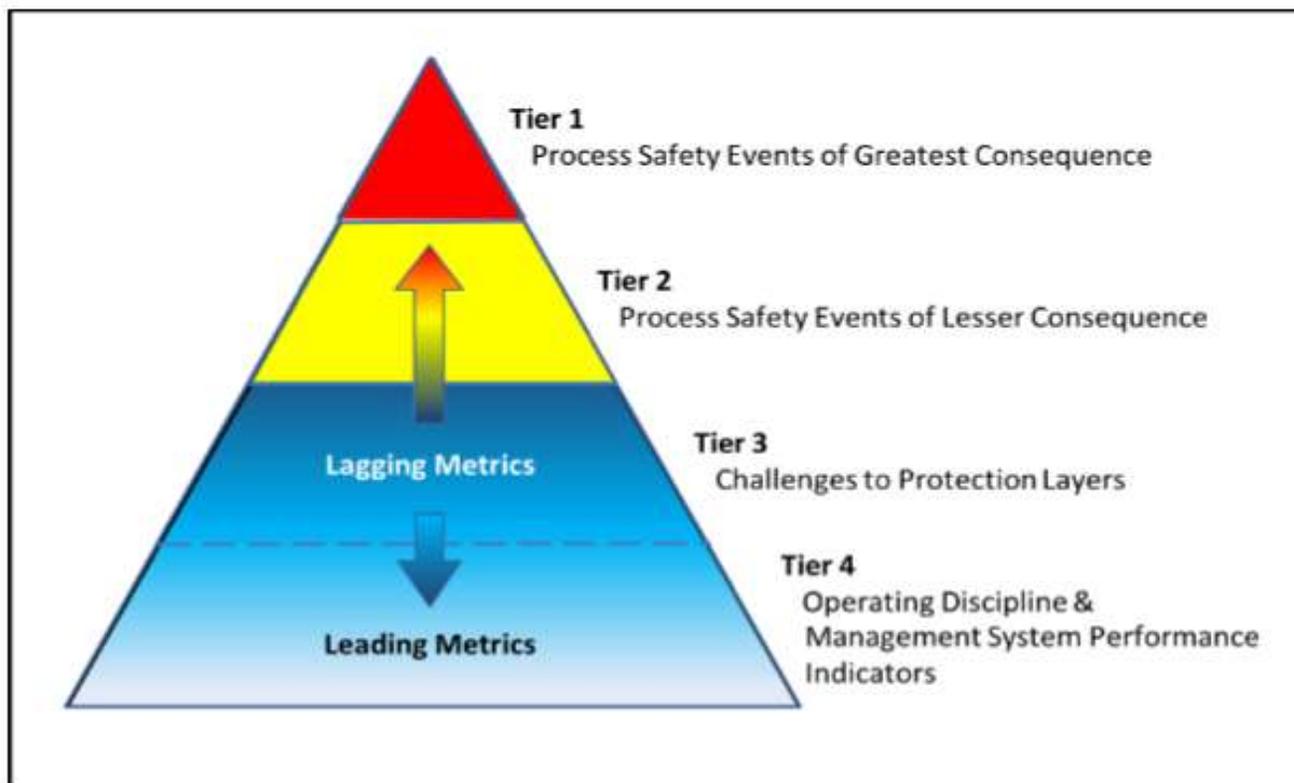




Ranking SCE Safety Risks Ranking



Process Safety Metrics: Guide for Selecting Leading and Lagging Metrics



Notes:

- Tier 3, Challenges to Protection Layers; includes near miss incidents
- Tier 4, Operating Discipline & Management System Performance Indicators; includes proactive evaluations and continuous improvement efforts, such as operational discipline surveys [8], management reviews [7], process safety management system audits [9], and field observations (e.g., behavior-based observations).

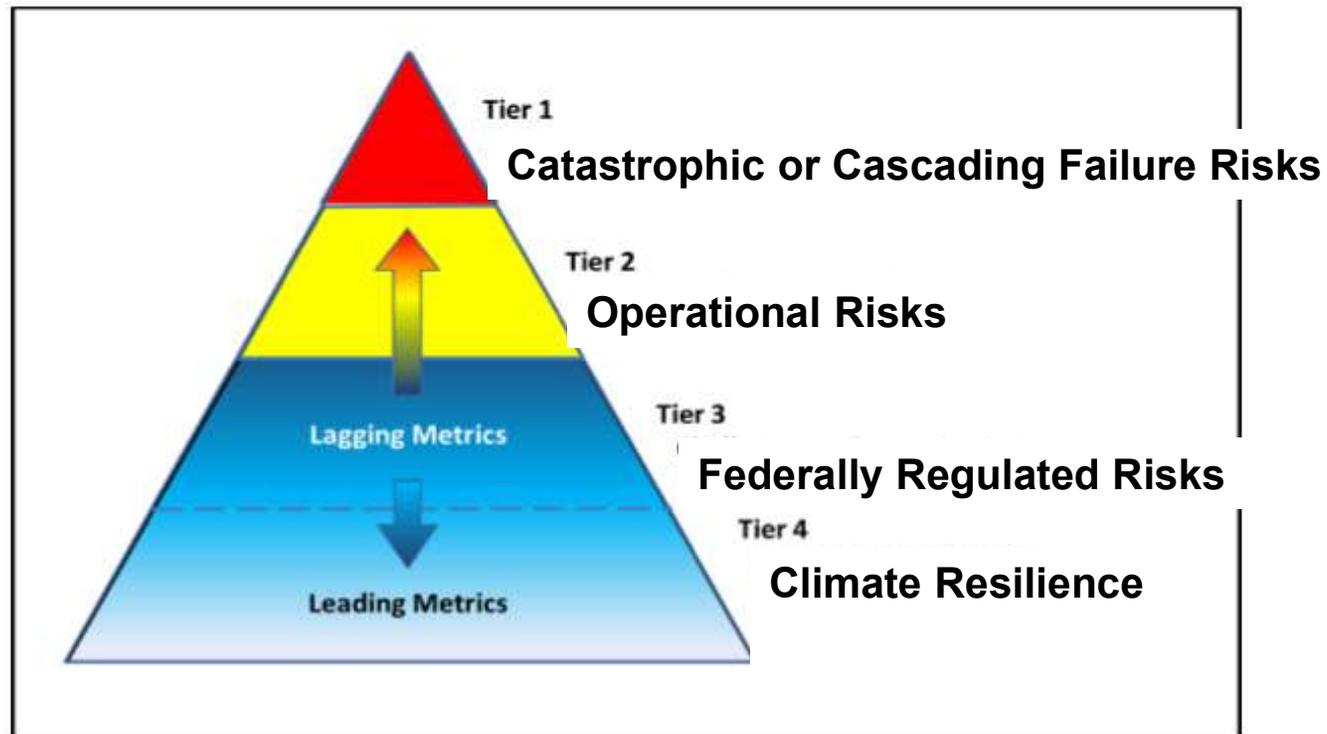




Recommended Risk Ranking Tiers



Process Safety Metrics: Guide for Selecting Leading and Lagging Metrics



Notes:

- Tier 3, Challenges to Protection Layers; includes near miss incidents
- Tier 4, Operating Discipline & Management System Performance Indicators; includes proactive evaluations and continuous improvement efforts, such as operational discipline surveys [8], management reviews [7], process safety management system audits [9], and field observations (e.g., behavior-based observations).





Recommended Risk Rankings

Tier 1 Risks

Distribution

Wildfire



Ignition associated with SCE worker or asset which potentially causes a wildfire

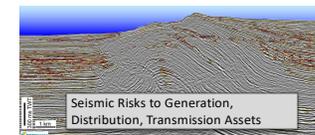


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Tier 2 Risks

 <p>Contact with Energized Equipment</p> <p>Contact with energized equipment which potentially causes electric shock</p>	 <p>Cyber Attack</p> <p>Compromise of SCE system controls which potentially leads to data infiltration, loss of control, and/or adversary control of grid control systems</p>	 <p>Under-ground Equipment Failure</p> <p>Asset failure which potentially causes substantial and uncontrolled release of energy from a vault or manhole</p>	 <p>Physical Security</p> <p>Compromise of SCE physical security which potentially leads to workplace violence, property theft, asset/equipment damage, or loss of control of asset</p>	 <p>Employee, Contractor and Public Safety</p> <p>Act performed which potentially exposes workers or public to hazards</p>
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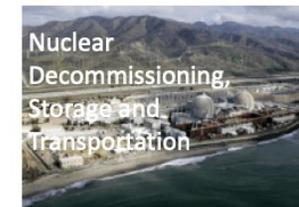


Tier 3 Risks



Hydro Asset Safety

Uncontrolled rapid release of water that potentially inundates populated or unpopulated areas



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Assessment of Proposed Mitigation Plans for Selected Priority Risks

Review of Two Mitigation Plans

- Contact with Energized Equipment
- Wildfire Safety





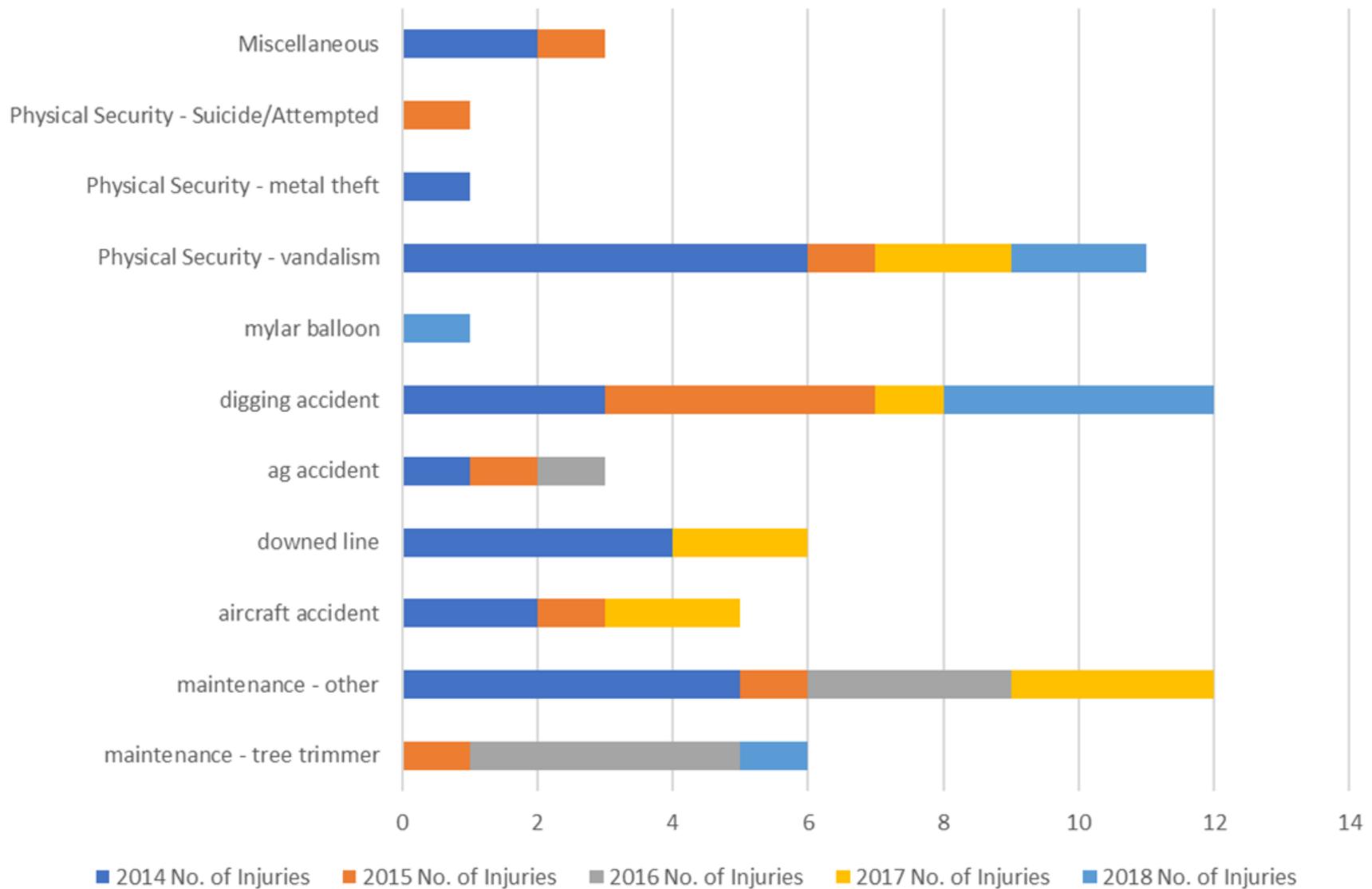
Assessment of Proposed Mitigation Plans for Selected Priority Risks

(Public) Contact with Energized Equipment





SCE Safety Performance Metrics - Contact w/ Energized Eq, Injuries





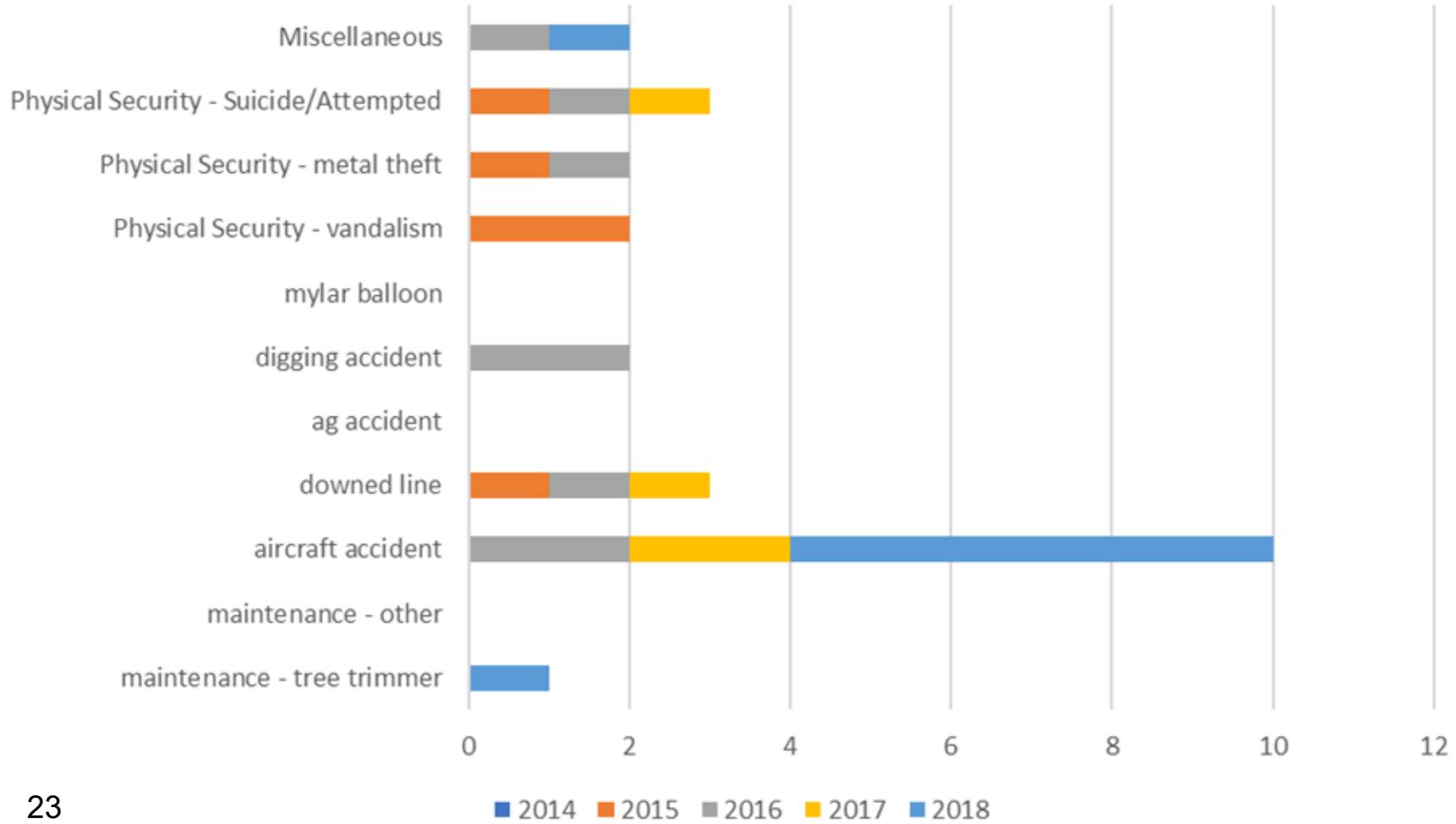
SCE Risk Analytics – Number of Injuries by Year

	2014	2015	2016	2017	2018	TOTALS
cause/year	No. of Injuries					
maintenance - tree trimmer	0	1	4	0	1	6
maintenance - other	5	1	3	3	0	12
aircraft accident	2	1	0	2	0	5
downed line	4	0	0	2	0	6
ag accident	1	1	1	0	0	3
digging accident	3	4	0	1	4	12
mylar balloon	0	0	0	0	1	1
Physical Security - vandalism	6	1	0	2	2	11
Physical Security - metal theft	1	0	0	0	0	1
Physical Security - Suicide/Attempted	0	1	0	0	0	1
Miscellaneous	2	1	0	0	0	3
	24	11	8	10	8	61





SCE Safety Performance Metrics - Contact w/ Energized Eq, Fatalities





SCE Risk Analytics – Number of Fatalities by Year

	2014	2015	2016	2017	2018	
cause/year	No. of Fatalities					
maintenance - tree trimmer	3	0	0	0	1	4
maintenance - other	2	0	0	0	0	2
aircraft accident	1	0	2	2	6	11
downed line	3	1	1	1	0	6
ag accident	0	0	0	0	0	0
digging accident	0	0	2	0	0	2
mylar balloon	0	0	0	0	0	0
Physical Security - vandalism	1	2	0	0	0	3
Physical Security - metal theft	0	1	1	0	0	2
Physical Security - Suicide/Attempted	2	1	1	1	0	5
Miscellaneous	0	0	1	0	1	2
	12	5	8	4	8	37





Risk Drivers – Contact with Energized Equipment 2014-2018

Major Causes of Injuries

- Maintenance workers
- Digging accidents – contact with underground equipment
- Vandalism of utility assets



Major Causes of Fatalities

- Aircraft accidents



SCE Proposed Mitigation – Contact with Energized Equipment

Proposed Capital Budget, Risk Score Reduction and Risk Spend Efficiency
2018 - 2023

ID	Name	Implementation Period		Cost Estimates (\$M)		Expected Value (MARS)		Tail Average (MARS)	
		Start Year	End Year	Capital	O&M	MRR	RSE	MRR	RSE
Contact W Energized Equipment (Amendment)									
C1	Overhead Conductor Program (DCP)	2018	2023	\$715	x	3.22	0.0045	3.37	0.0047
C1a	Overhead Conductor Program (DCP) Utilizing Targeted Covered Conductor	2021	2023	\$34	x	0.10	0.0029	0.1	0.003
C2	Public Outreach	2018	2023	x	\$33	0.42	0.013	0.46	0.014
M4	Infrared Inspection	2018	2023	x	\$3	1.04	0.3627	1.09	0.3797
M5	Wildfire Covered Conductor Program	2018	2023	\$1,161	x	0.54	0.0005	0.55	0.0005
TOTAL				\$1,910	\$36	5.32	0.0027	5.57	0.0029





SCE Proposed Mitigation – Contact with Energized Equipment

Questions:

1. Why invest almost \$750 million on mitigations when safety performance has improved over last five years?

SCE RAMP Report did not explain reason for improved metrics

2. Why are certain risk drivers, e.g. physical security and underground excavation ignored in proposed plan?

3. Why is the wildfire covered conductor program included under this risk?

BTW, it has highest cost, lowest RSE, and seems to have marginal benefit, gets only 10% risk reduction.





Comments on SCE RAMP Report Contact with Energized Equipment Mitigation Program

- RAMP Report does not provides sufficient justification to support funding proposed mitigation plan.
- Proposed mitigation plan has no strategy or rationale for heavy investment in covered conductors. Does not address risk drivers.
- Risk modeling results does not agree with historical data.





Assessment of Proposed Mitigation Plans for Selected Priority Risks

Wildfire Safety





Wildfire Mitigation Requirements

Pursuant to Public Utilities Code Section 8386, R.18-10-007 requires the electric utilities to file **annual wildfire mitigation plans** that include:

- **A description of performance metrics** to evaluate the mitigation plan's and individual measure performance.
- **A description of how risk analytics and metrics were utilized** to evaluate past performance and utility planning. The plans must include a discussion of how, "the application of previously identified metrics to previous plan performances" has informed each plans.

Public Utilities Code Section 8386(b)(4) (5); See also Order Instituting Rulemaking to Implement Electric Utility Wildfire Mitigation Plans Pursuant to Senate Bill 901 (2018)," October 25, 2018, in R.18 10-007.





SCE WMP Proposed Mitigation Measures & Budgets

SCE RAMP Proposed Mitigation Measures, Budgets, Risk Impacts and RSE

Capital Investments

Wildfire Mitigation Plan Proposed Mitigations					RAMP Wildfire Mitigations									
SB901 Activity Identifier	Activity/Program	Capital Cost 2019 (\$M) (\$Nominal)(2019 Goal)	O&M Cost 2019 (\$M) (\$Nominal)(2019 Goal)	ID	Name	Implementation Period		Cost Estimates (\$M)		Expected Mean Value (MARS)		Tail Average (MARS)		
						Start Year	End Year	Capital	O&M	MRR	RSE	MRR	RSE	
D&C	AT-1 Alternative Technology Pilots	0.2	NA											
	AT-2 GSRP Wildfire Mitigation Program Study	NA	0.6											
	AT-3 Alternative Technology Evaluations	NA	0											
	AT-4 Alternative Technology Implementation	NA												
I&M	IN-1 Distribution Enhanced Overhead Inspections and Remediation in HFRA	102.8	144.9											
	IN-2 Transmission Enhanced Overhead Inspections and Remediation in HFRA	9.9	25											
	IN-3 Quality Oversight/Quality Control of EOI	NA	NA	M4	Infrared Inspection Program	2018	2023	x	\$3	0.29	0.1029	0.95	0.3321	
	IN-4 Infrared Inspection of energized overhead distribution facilities and equipment	NA	0.5											
	IN-5 Infrared inspection, corona scanning and high definition imagery of energized overhead transmission facilities and equipment	NA	5.7											
D&C	NA AGP - Drive by of overhead distribution facilities and equipment	NA												
	NA Automatic Reclosers Replacement Program	2.4	NA	M2	Remote-controlled Automatic Reclosers and Capacitor Bank Replacement Program	2018	2019		\$28	\$3	0.97	0.0311	3.35	0.1075
I&M	NA Deteriorated Pole Program	18.1	NA											
	NA Detailed Inspection of Transmission facilities and equipment	NA	5.7	M8	Fusing Mitigation	2018	2020		\$68	\$23	0.23	0.0025	0.74	0.0081
	NA Insulator Washing	NA	251.2											
	NA IPI - Intrusive pole inspections to identify rot and decay	NA	1.2											
	NA ODI - Detailed Inspections of Distribution overhead facilities and equipment	NA	6.1											
D&C	NA Overhead Conductor Program	NA	8.6											
	NA PCB Transformers Replacement Program	143.9	NA	C1	Overhead Conductor Program (Bare & Cover)	2018	2023		\$102	x	0.09	0.0009	0.3	0.003
OP	NA Performance of joint patrols with fire agencies	1.5	NA	C2	FR Overhead Distribution Transformer	2018	2023		\$81	x	0.06	0.0007	0.18	0.0022
	NA Pole Brushing	NA	NA											
I&M	NA Pole Loading Program	NA	26.4											
	NA PPS/De-energization Protocol Support Costs	NA	4.3											
OP	NA Road and Right-of-Way Maintenance	NA	3.9											
	NA Substation Inspection and Maintenance	NA	2.2											
I&M	NA Supplemental Inspections of HFRA	NA	69.1 Distribution, 11.3 Transmission											
	NA Transmission Line Rating Remediation	157.9	8.2											
OP	OP-1 Annual SOB 322 Review	NA	NA											
	OP-2 Wildfire Infrastructure Protection Team Additional Staffing	NA	0.5											
SCA	PPSP-1 De-Energization Notifications	NA	1.3	M3	PPSP Protocol and Support Functions	2018	2023	x	\$21		1.90	0.0892	6.66	0.3119
	SA-1 Additional Weather Stations	5.4	0.6	M7	Enhanced Situational Awareness	2018	2023		\$31	\$26	0.84	0.0149	3.19	0.0561
	SA-2 Fire Potential Index Phase II	NA	0.6											
	SA-3 Additional HD Cameras	2.3	2.6											
	SA-4 High-performing Computer Weather Modeling System	3.8	0.1											
	SA-5 Develop Asset Reliability and Risk Analytics Capability	0.5	NA											
D&C	SH-1 Covered Conductor	47.4	1.0	M1	Wildfire Covered Conductor Program	2018	2023		\$1,161	x	1.64	0.0014	5.28	0.0045
	SH-2 Evaluation of Undergrounding in HFRA	0	0											
	SH-3 Composite Poles and Crossarms	5.1	0.1	M9	Fire Resistant Poles (M1 Scope)	2018	2023		\$137	x	0.60	0.0044	2.26	0.0165
	SH-4 Branch Line Protection Strategy	46.1	0.9											
	SH-5 Remote Controlled Automatic Reclosers Installations	4.9	0.1											
	SH-6 Remote Controlled Automatic Reclosers Setting Updates	NA	0.3											
	SH-7 Circuit Breaker Fast Curve	9.1	0.2											
I&M	VM-1 Hazard Tree Mitigation Program (HTMP)	NA	25.5	M5	Expanded Vegetation Management	2018	2023	x	\$370		0.38	0.001	1.23	0.0033
	VM-2 Expanded Pole Brushing	NA	0.9											
	VM-3 Expanded Clearance distances at time of maintenance	NA	28.0											
	VM-4 DRI quarterly inspections and removals	NA	41.5											
	VM-5 LIDAR Inspections of Transmission	NA	3.7											
TOTALS		\$812.5	\$351.2						\$1,609	\$447	7.02	0.0034	24.14	0.0117

WMP Color Legend	no. of tasks	Capital (\$M)	O&M (\$M)
Design & Construction (D&C)	15	\$278.7	\$3.2
Inspection and Maintenance (I&M)	22	\$521.8	\$334.1
Operational Practices (OP)	2	\$0.0	\$6.1
Situational/Conditional Awareness (SCA)	5	\$12.0	\$3.9
Response and Recovery (R&R)	0	\$0.0	\$0.0
	44	\$812.5	\$347.3

44 mitigations

10 mitigations





SCE WMP versus RAMP Wildfire Safety Proposed Budgets by Activity Type

WMP Color Legend	Wildfire Mitigation Plan (2019)			RAMP Wildfire Mitigations (2018-2023)		
	no. of tasks	Capital (\$M)	O&M (\$M)	no. of tasks	Capital (\$M)	O&M (\$M)
Design & Construction (D&C)	15	\$278.7	\$3.2	5	\$1,509.0	\$3.0
Inspection and Maintenance (I&M)	22	\$521.8	\$334.1	3	\$68.0	\$396.0
Operational Practices (OP)	2	\$0.0	\$6.1	1	\$0.0	\$21.0
Situational/Conditional Awareness (SCA)	5	\$12.0	\$3.9	1	\$31.0	\$26.0
Response and Recovery (R&R)	—	\$0.0	\$0.0	0	\$0.0	\$0.0
	44	\$812.5	\$347.3	10	\$1,608.0	\$446.0

- **WMP CapEx ≠ RAMP Proposed CapEx**
- **WMP > \$800 M; = \$4.0 B over five years?**
- **RAMP > \$1.6 B over five years**

- **WMP O&M Ex < RAMP Proposed?**
- **WMP > \$1.5 B over five years?**
- **RAMP > \$450 M over five years**

- **64% of WMP CapEx is inspection and maintenance**
- **94% of RAMP Proposed is design and construction**

- **No proposed spending for response and recovery**





Comparison of WMPs		SDG&E		PG&E		SCE	
Type of Mitigation		no. of tasks	% Of Total Budget	no. of tasks	% of Total Budget	no. of tasks	% of Total Budget
Design & Construction (D&C)		13	23	9	21	15	34
Inspection and Maintenance (I&M)		22	39	11	26	22	50
Operational Practices (OP)		7	12	12	28	2	5
Situational/Conditional Awareness (SCA)		7	12	8	19	5	11
Response and Recovery (R&R)		8	14	3	7	0	0
Total # of Mitigation Measures		57		43		44	





In Closing . . .

- **SCE RAMP Report advances California's utility risk evaluation framework** by demonstrating value of risk modeling protocols, risk scoring to evaluate risks, and proposed mitigation plans and budgets across a utility's operations.
- **With this framework, Safety and Enforcement Division ranked utility risks** to reflect public safety needs in Southern California
- **RAMP evaluation provides valuable input that will inform SCE's upcoming general rate case filing.** Evaluation improves likelihood that filing is compliant with recent changes to the California Public Utilities Code.





Upcoming CPUC Hearings related to SCE

06/24/19
9:30 a.m. to
4:00 p.m.
ALJ Houck
Comr Picker

A.18-03-009 (EH) - Joint Application of Southern California Edison Company (U338E) and San Diego Gas & Electric Company (U902E) for the 2018 Nuclear Decommissioning Cost Triennial Proceeding.
Commission Courtroom, State Office Building, 505 Van Ness Avenue, San Francisco, CA (and June 25th)

07/01/19
10:00 a.m.
ALJ Haga
Comr Picker

A.18-09-002 (EH) – Application of Southern California Edison Company (U338E) for Approval of Its Grid Safety and Resiliency Program.
Commission Courtroom, State Office Building, 505 Van Ness Avenue, San Francisco, CA (until July 3rd and July 8th – 10th)

